UNITED STATES PATENT AND TRADEMARK OFFICE

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10/667,396	09/23/2003	Takeshi Yoneda	032405R156	9368

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>06 September 2007</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-3,5-7,9-11,26,29,31,32 and 34-36* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-3,5-7,9-11,26,29,31,32 and 34-36* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☒ All   b) ☐ Some * c) ☐ None of:

      1. ☒ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1.   Newly submitted claim 37 is directed to an invention that is independent or distinct from

the invention originally claimed for the following reasons:

Referring to claims 1-3, 5-7, 9-11, 26, 29, 31, 32, 34-36, species A1 corresponds to,

"computes the final clutch torque by a computation involving the first clutch torque and the

second clutch torque in association with a ratio coefficient value which ratio coefficient value

changes according the diameter difference of the tire so as to suppress a wheel slippage" See

claims 1

Referring to claim 37, species A2 corresponds to, "computes the final clutch torque by a

computation involving (i) the first clutch torque and a first weighting value associated with said

tire diameter difference value and (ii) and the second clutch torque and a second weighting value

associated with said tire diameter difference value, and wherein said first and second weighting

values Vary in opposite fashion upon a change in the tire diameter value."

Restriction for examination purposes as indicated is proper because all these inventions

listed in this action are independent or distinct for the reasons given above and there would be a

serious search and examination burden if restriction were not required because one or more of

the following reasons apply:

(a) the inventions have acquired a separate status in the art in view of their different

classification;

(b) the inventions have acquired a separate status in the art due to their recognized

divergent subject matter;

(c) the inventions require a different field of search (for example, searching different

classes/subclasses or electronic resources, or employing different search queries);

(d) the prior art applicable to one invention would not likely be applicable to another

invention;

(e) the inventions are likely to raise different non-prior art issues under 35 U.S.C. 101

and/or 35 U.S.C. 112, first paragraph.

Since applicant has received an action on the merits for the originally presented invention

of Species A1, this invention has been constructively elected by original presentation for

prosecution on the merits.

Accordingly, claim 37 is withdrawn from consideration as being directed to a non-elected

invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Upon allowance of a generic claim rejoinder of non-elected species will be considered.

Claim Rejections - 35 USC § 112

2.   The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making
> and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it
> pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode
> contemplated by the inventor of carrying out his invention.

3.   Claims 2, 3, 34, 35 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply

with the enablement requirement. The claim(s) contains subject matter which was not described

in the specification in such a way as to enable one skilled in the art to which it pertains, or with

which it is most nearly connected, to make and/or use the invention.

Claim 2 recites, "a switching function by using at least a polarity related to an integral term of the deviation and by applying a sliding mode control". Applicant does not disclose the meaning of or how to determine "deviation.......with a switching function", "polarity related to an integral term of the deviation", and how to apply "a sliding mode control". Thus the limitations are not enabled.

Claim 3 recites, "the final clutch torque computing unit reduces *the ratio coefficient value associated with said second clutch torque* and increases *the ratio coefficient value associated with said first clutch torque* as the diameter difference of the tire increases". The limitation is not enabled. How and in what manner is *the ratio coefficient value associated with said second clutch torque*? How and in what manner is *the ratio coefficient value associated with said first clutch torque*? That is claim 1 discloses a ratio coefficient value which changes according to a diameter difference of a tire. There is no disclosure of a *ratio coefficient value associated with said first and second clutch torques.*

The rejection applies to claim 35.

In claim 34, applicant has not explained the meaning of "summed at specific rate". How and in what manner are first and second torques summed at a specific rate?

4.   The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5.   Claim 35, and 3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 35, "the ratio of the first clutch torque" lacks antecedent basis. Further, "the

ratio of the second clutch torque" lacks antecedent basis.

The rejection applies to claim 3.

Claim Rejections - 35 USC § 103

6.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 103 that form the

basis for the rejections under this section made in this Office action.

7.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

8.   Claims 1-3, 5-7, 9-11, 26, 29, 31, 32, 34-35 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Ozaki et al (US 2002/0005077) in view of Drexl (6040768).

Regarding claim 1, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) disclose a differential

limiting control apparatus for a vehicle having a clutch unit (3, 16, 19) interposed between one

rotational shaft 2 and another rotational shaft 9 (fig. 1, sec. 0042-0046) for variably changing a

driving force transmission between the one rotational shaft 2 and the other rotational shaft 9,

comprising:

a target differential speed setting unit for setting a target differential speed between the

one rotational shaft and the other rotational shaft (sec. 0063);

an actual differential speed detecting unit for detecting an actual differential speed

between the one rotational shaft and the other rotational shaft (sec. 0063);

a first control unit for computing unit for computing a first clutch torque (FF) of the

clutch unit based on a deviation between a target differential speed and an actual differential

speed (sections abstract, 0021, 0025, 0031, 0054, 0057, 0063-0080; figs, 1-4, 8-13);

a throttle opening amount detecting unit 40 for detecting a throttle 21 opening (sec.

0041);

a second control unit for computing a second clutch torque (FB) of the first clutch unit

based on a throttle opening amount (sections abstract, 0021, 0025, 0031, 0054, 0057, 0063-0080;

figs, 1-4, 8-13);

a final clutch torque computing unit (figs 1, 12) for computing a final clutch torque (assist

clutch), wherein the final clutch torque computing unit computes the final clutch torque by a

computation involving the first clutch torque and the second clutch torque (see assist clutch

computed from FF and FB, steps 2072 to 2075; sec. 0074) in association with a ration (i.e. gear

ratio of transmission, abstract, sec. 0067) so as to suppress a wheel slippage (sec. 0067)

Ozaki did not disclose "tire diameter", and "diameter difference of the tire".

However, Drexel teaches of a differential limiting control apparatus for a vehicle having

a clutch unit interposed between one rotational shaft and another rotational shaft for variably

changing a driving force transmission between the one rotational shaft and the other rotational

shaft, comprising:

computing a ratio coefficient (i.e. a transmission ratio), which ratio coefficient value

changes according to a diameter difference of a tire (col. 3, lines 10-25; col. 7, lines 57 to col. 8,

lines 14, abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ozaki as taught by Drexl for the purpose of monitoring wear status of a friction clutch (abstract).

Regarding claim 2, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel disclose the differential limiting control apparatus of claim 1, wherein:

the first control unit comprises:

a first clutch torque computing unit for computing the first clutch torque by obtaining the deviation between the target differential speed and the actual differential speed with a switching function by using at least a polarity related to an integral term of the deviation and by applying a sliding mode control.

Regarding claim 3, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel disclose the differential limiting control apparatus as set forth in claim 1, wherein:

the final clutch torque computing unit reduces the ratio coefficient (i.e. transmission ratio) value associated with said second clutch torque and increases the ratio coefficient value associated with said first clutch torque as the diameter difference of the tire increases.

Regarding claim 5, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel disclose the differential limiting control apparatus as set forth claim 1, wherein:

the clutch unit is interposed between a front axle and a rear axle.

Regarding claim 6, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel disclose the differential limiting control apparatus as set forth claim 2, wherein:

the clutch unit is interposed between a front axle and a rear axle.

Regarding claim 7, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the differential limiting control apparatus as set forth claim 3, wherein:

the clutch unit is interposed between a front axle and a rear axle.

Regarding claim 9, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the differential limiting control apparatus as set forth claim 1, wherein:

the clutch unit limits a differential action of a differential interposed between a left wheel

and a right wheel.

Regarding claim 10, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the differential limiting control apparatus as set forth Claim 2, wherein:

the clutch limits a differential action of a differential interposed between a left and a right

wheel.

Regarding claim 11, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the differential limiting control apparatus as set forth Claim 3, wherein:

the clutch limits a differential action of a differential interposed between a left and a right

wheel.

Regarding claim 12, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the differential limiting control apparatus as set forth Claim 4, wherein:

the clutch limits a differential action of a differential interposed between a left and a right

wheel.

Regarding claim 26, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the apparatus as set forth in claim 1, further comprising a brake switch, and

when an On signal is inputted from the brake switch, the second clutch torque is made to

be zero.

Regarding claim 29, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose a final clutch torque which involves the claimed equation as disclosed by the applicant.

Regarding claim 31, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the ratio coefficient value wherein the ratio coefficient value decreases as diameter

difference of tire increase.

Regarding claim 32, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the ratio coefficient value wherein the ratio coefficient value is 0.5 in the case where the

diameter difference of the tire is substantially zero.

Regarding claim 34, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the differential limiting control apparatus as set forth in claim 1, wherein the' first torque

and the second torque are summed at a specific rate and said specific rate changes according to

the diameter difference of the tire.

Regarding claim 35, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) as modified by Drexel

disclose the differential limiting control apparatus as set forth in claim 1, wherein the ratio of the

first clutch torque increases and the ratio of the second clutch toque decreases as the diameter

difference of the tire increases, and the ratio of the first clutch torque decreases and the ratio of

the second clutch toque increases as the diameter difference of the tire decreases.

9.   Claim 36 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ozaki et al (US

2002/0005077) in view of Drexl (6040768) and further in view of Matsuno (6553303).

Regarding claim 36, Ozaki (figs. 1, 2; abstract, sec. 0042-0046) disclose a differential

limiting control apparatus for a vehicle having a clutch unit (3, 16, 19) interposed between one

rotational shaft 2 and another rotational shaft 9 (fig. 1, sec. 0042-0046) for variably changing a

driving force transmission between the one rotational shaft 2 and the other rotational shaft 9,

comprising:

a target differential speed setting unit for setting a target differential speed between the

one rotational shaft and the other rotational shaft (sec. 0063);

an actual differential speed detecting unit for detecting an actual differential speed

between the one rotational shaft and the other rotational shaft (sec. 0063);

a first control unit for computing unit for computing a first clutch torque (FF) of the

clutch unit based on a deviation between a target differential speed and an actual differential

speed (sections abstract, 0021, 0025, 0031, 0054, 0057, 0063-0080; figs, 1-4, 8-13);

a throttle opening amount detecting unit 40 for detecting a throttle 21 opening (sec.

0041);

a second control unit for computing a second clutch torque (FB) of the first clutch unit

based on a throttle opening amount (sections abstract, 0021, 0025, 0031, 0054, 0057, 0063-0080;

figs, 1-4, 8-13);

a final clutch torque computing unit (assist clutch, figs 12) for computing a final clutch

torque, wherein the final clutch torque computing unit which computes the final clutch torque by

a computation involving the first clutch torque and the second clutch torque (i.e. assist clutch is

computed from FF and FB, steps 2072 to 2075; sec. 0074) in association with a ration (i.e. gear

ratio of transmission, abstract, sec. 0067) so as to suppress a wheel slippage (sec. 0067)

Ozaki did not disclose, "tire diameter", and "diameter difference of the tire".

However, Drexel teaches of a differential limiting control apparatus for a vehicle having a clutch unit interposed between one rotational shaft and another rotational shaft for variably changing a driving force transmission between the one rotational shaft and the other rotational shaft, comprising:

computing a ratio coefficient (i.e. a transmission ratio), which ratio coefficient value changes according to a diameter difference of a tire (col. 3, lines 10-25; col. 7, lines 57 to col. 8, lines 14, abstract).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ozaki as taught by Drexl for the purpose of monitoring wear status of a friction clutch (abstract).

Ozaki and Drexl did not disclose a final clutch section that receives as input a tire diameter difference value. However, Matsuno teaches of a final clutch computing section which receives as input a tire diameter difference value to compute a final clutch.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Ozaki and Drexl as taught by Matsuno for the purpose of teaching an easy and cost efficient method to connect a tire difference judging device in a transmission control circuit.

MPEP 2114

The statements of intended use or field of use, "to effectively suppress", "adequately setting", see claims 1 and 13; "computes", see claim 25; "when ON is inputted", "is made zero", see claim 26; and the equation ($Tlsd = RtrT \, lsdff + (1-Rtr).Tlsdfb$" etc clauses are essentially

method limitations or statements of intended or desired use. Thus, these claims as well as other

statements of intended use do not serve to patentably distinguish the claimed structure over that

of the reference.

See MPEP § 2114 which states:

A claim containing a "recitation with respect to the manner in which a claimed

apparatus is intended to be employed does not differentiate the claimed apparatus from the prior

art apparatus" if the prior art apparatus teaches all the structural limitations of the claim.

Claims directed to apparatus must be distinguished from the prior art in terms of

structure rather than functions.

Apparatus claims cover what a device is not what a device does.

As set forth in MPEP § 2115, a recitation in a claim to the material or article

worked upon does not serve to limit an apparatus claim.

Applicant may overcome the MPEP 2114 section by using language such as "a target

differential speed setting unit configured to set a"; "an actual differential speed detecting unit

configures to detect", etc in through out the claims.

Response to Arguments

10.   Applicant's arguments with respect to claim 9/6/07 have been considered but are moot in

view of the new ground(s) of rejection.

Communication

11.   Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Ronnie Mancho whose telephone number is 571-272-6984. The

examiner can normally be reached on Mon-Thurs: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the

organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent

Application Information Retrieval (PAIR) system. Status information for published applications

may be obtained from either Private PAIR or Public PAIR. Status information for unpublished

applications is available through Private PAIR only. For more information about the PAIR

system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR

system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ronnie   Mancho
Examiner
Art Unit 3663

11/12/2007

/Jack W. Keith/
SPE 3663